Floating Suction Pressure Control

PlantVisorPRO

User manual

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READ AND SAVE THESE INSTRUCTIONS

Technology & Evolution

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1. Introduction

The PlantVisorPRO **Floating Suction Pressure Control** plug-in has been designed to reduce the energy consumption of showcases. To do this, it periodically analyses the operation of the showcases associated with the compressor racks that have been enabled, and, based on the duty cycle values calculated for each showcase, automatically modify the set point of the rack. This minimises the delivery of liquid refrigerant and consequently reduces power consumption in the medium and long term.

Of the devices present in the installation, Floating Suction Pressure Control only involves those that manage showcases or compressor racks, and for these devices only displays the essential parameters for this function. The parameters of the algorithm are already set in the factory, however they can be customised based on specific features of the installation.

Note: A PlantVisorPRO plug-in is an optional module to be installed on a computer where PlantVisorPRO Local is already installed and configured.

2. Installation and registration

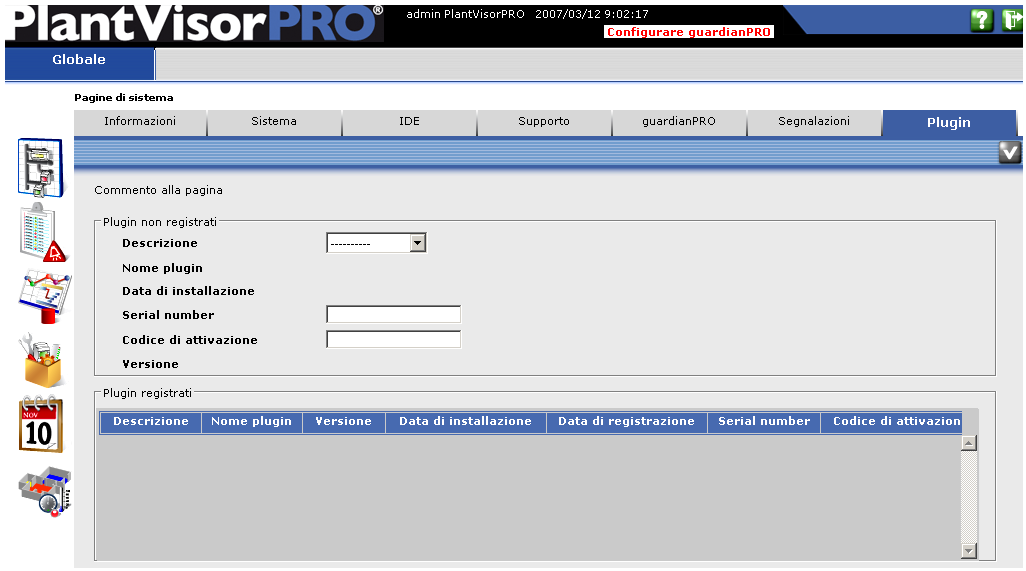
After having installed Floating Suction Pressure Control it needs to be registered.

At www.carel.com click the link **Request PlantVisorPRO activation code**, and complete all the fields on the application form.
Important: the MAC-address will be requested, which is found on the PlantVisorPRO system page, and the "Serial Number" printed on the CD.

Once the data have been confirmed, a page will be displayed showing the "activation code", to be entered on the system page.

Then, proceed as follows:

1. Click **Configuration** in PlantVisorPRO Local and select **System pages**
2. Click the **Plugin** page: the following page will be displayed for entering the registration data:



1. From the **Description** list select the plug-in to be registered.
2. Enter the serial number on the installation package.
3. Enter the activation code previously acquired from www.carel.com.
4. Click to save the data.

3. How to use Floating Suction Pressure Control

The control function must be first configured and then activated. To do this, proceed as follows:

1. Open the plug-in.
2. Choose which systems the control is to act on.
3. Associate these systems with the showcases.
4. Start Floating Suction Pressure Control.
5. Monitor variations in the set point of the compressor rack in order to adjust, if necessary, the parameters of the algorithm.

Once the control has started, the following operations are possible:

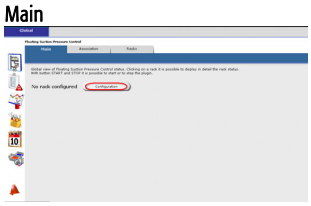
- Enable/disable the control on a compressor rack
- Reset the minimum and maximum peaks of the duty cycle on all the showcases
- Reset the minimum and maximum peaks of the duty cycle on an individual showcase
- Modify the parameters of the compressor rack and the maximum duty cycle of each showcase

4. Navigating the pages

The control has a first level with three pages: **Main**, **Associations** and **Systems**. These pages are connected by the **Next** button and are used to configure the Floating Suction Pressure Control. They can also be opened directly at any time by clicking the name of the page.

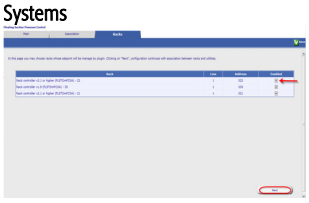
Here is the typical procedure for configuring the control:

Main



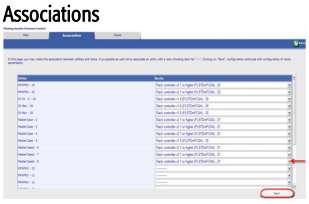
Click … Configure

Systems



Click Next

Associations

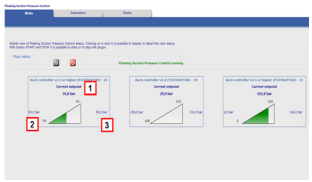


Click Next

The second level accesses two pages, **Compressor rack detail** and **Parameters**, which are used to display and set the parameters for the compressor rack and the maximum duty cycle for the showcase. Click the name of the page to open it.

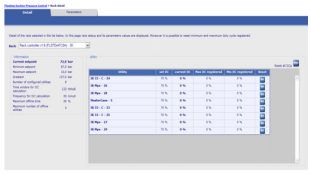
To display the details of a compressor rack:

Main



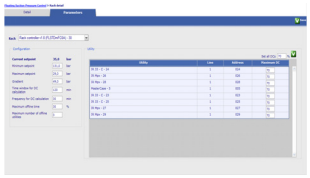
Double click the graph relating to the rack

Compressor rack detail



Click … the **Parameters** page

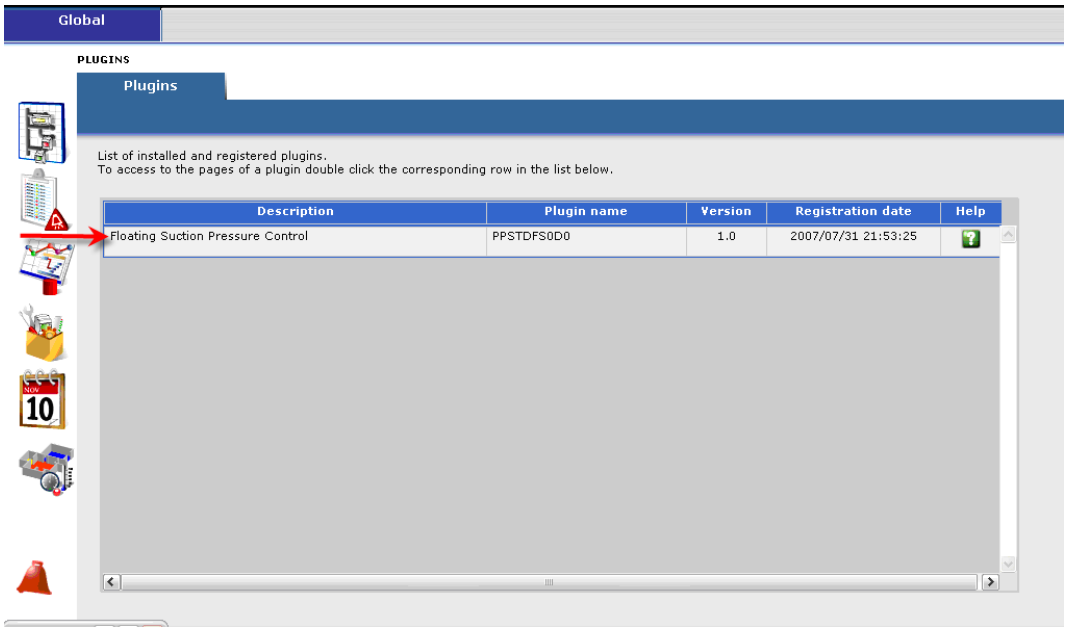
Parameters



Next

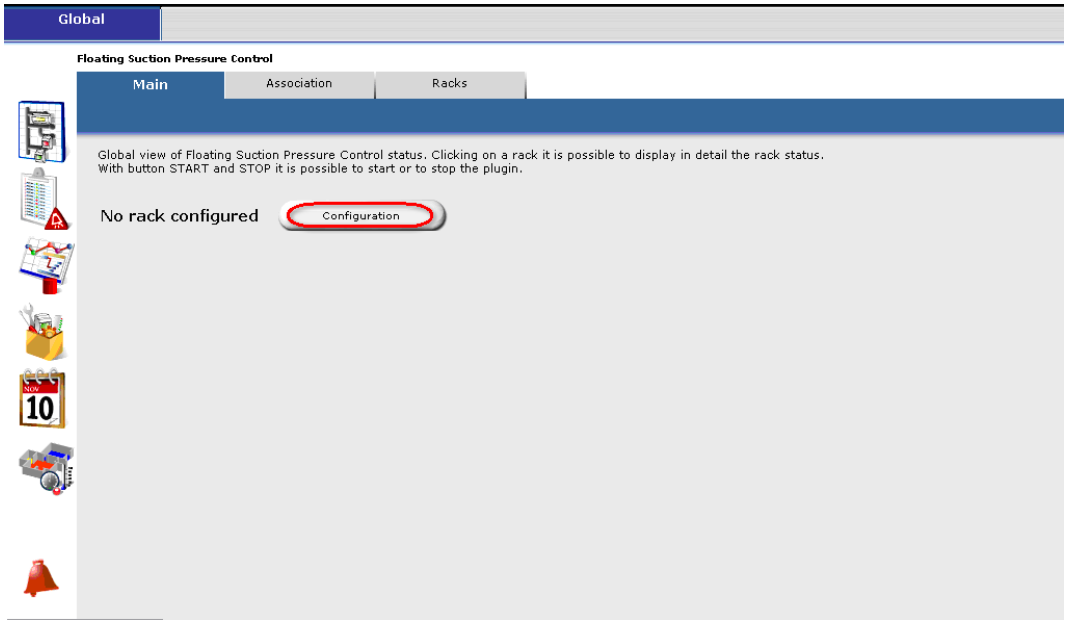
5. Opening Floating Suction Pressure Control

To access the plug-in click and select **PLUG-IN**: the list of plug-ins installed will be shown:



6. Configuring Floating Suction Pressure Control

After having entered the **PLUG-IN** section, double click **Floating Suction Pressure Control**: the main page is shown for configuring the control:


Global
Floating Suction Pressure Control
Main
Association
Racks
Global view of Floating Suction Pressure Control status. Clicking on a rack it is possible to display in detail the rack status.
With button START and STOP it is possible to start or to stop the plugin.
No rack configured
Configuration

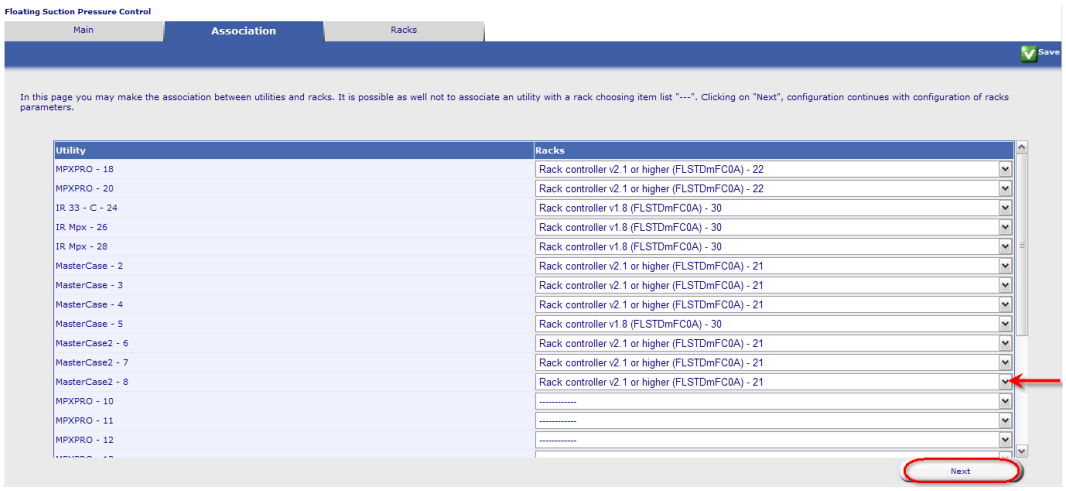
Click **Configuration**: the **Systems** page is shown, with the list of compressor rack controllers compatible with Floating Suction Pressure Control. On this page, select the systems to be enabled in the plugin.

NOTE: any devices not compatible with Floating Suction Pressure Control are not shown in the list.

NOTE: a maximum of eight systems can be enabled.

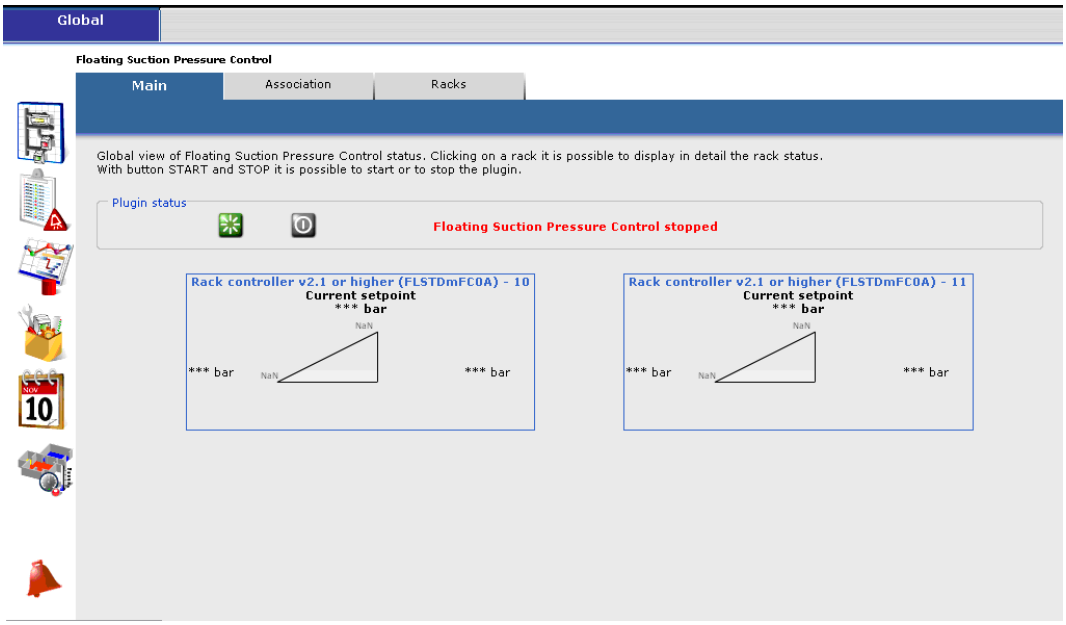
Click **Enable** for all the systems to be enabled.
At the end click **Next**: the page is displayed for associating the showcases with the enabled systems:

NOTE: any controllers not compatible with Floating Suction Pressure Control are not shown in the list.


Floating Suction Pressure Control
Main
Association
Racks
Save
In this page you may make the association between utilities and racks. It is possible as well not to associate an utility with a rack choosing item list "---". Clicking on "Next", configuration continues with configuration of racks parameters.
Utility
Racks
MPXPRO - 18
Rack controller v2.1 or higher (FLSTDmFC0A) - 22
MPXPRO - 20
Rack controller v2.1 or higher (FLSTDmFC0A) - 22
IR 33 - C - 24
Rack controller v1.8 (FLSTDmFC0A) - 30
IR Mpx - 26
Rack controller v1.8 (FLSTDmFC0A) - 30
IR Mpx - 28
Rack controller v1.8 (FLSTDmFC0A) - 30
MasterCase - 2
Rack controller v2.1 or higher (FLSTDmFC0A) - 21
MasterCase - 3
Rack controller v2.1 or higher (FLSTDmFC0A) - 21
MasterCase - 4
Rack controller v2.1 or higher (FLSTDmFC0A) - 21
MasterCase - 5
Rack controller v1.8 (FLSTDmFC0A) - 30
MasterCase2 - 6
Rack controller v2.1 or higher (FLSTDmFC0A) - 21
MasterCase2 - 7
Rack controller v2.1 or higher (FLSTDmFC0A) - 21
MasterCase2 - 8
Rack controller v2.1 or higher (FLSTDmFC0A) - 21
MPXPRO - 10
MPXPRO - 11
MPXPRO - 12
Next

The page shows all the devices that can be used to control showcases.
Only associate the devices that are effectively connected to the showcases with the systems. Leave as not configured ("--------") any devices that are not connected to the showcases in the list.

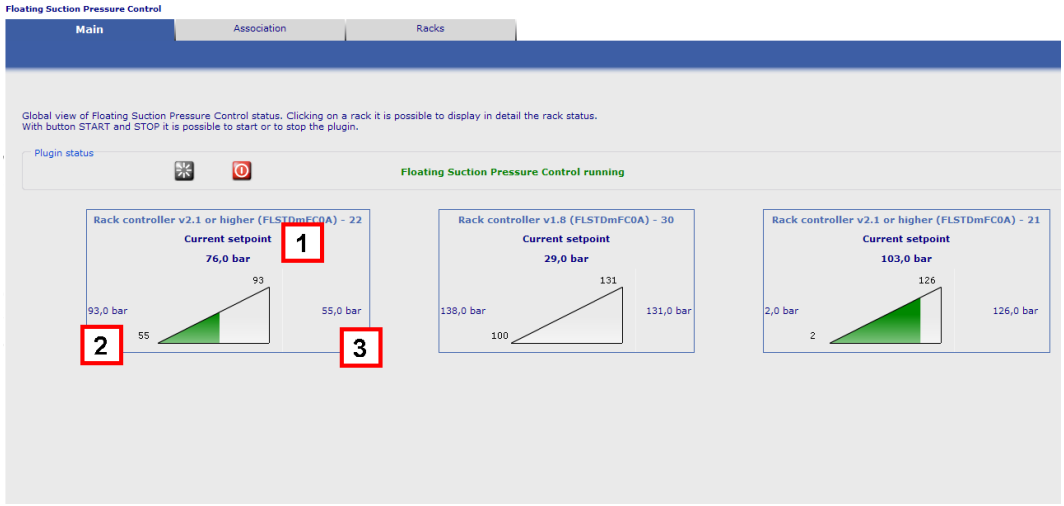
Click **Next**: the configuration is saved and the main page is shown again, with the graphs already set out for each rack:


Global
Floating Suction Pressure Control
Main
Association
Racks
Global view of Floating Suction Pressure Control status. Clicking on a rack it is possible to display in detail the rack status.
With button START and STOP it is possible to start or to stop the plugin.
Plugin status
Floating Suction Pressure Control stopped
Rack controller v2.1 or higher (FLSTDmFC0A) - 10
Current setpoint
*** bar
*** bar
*** bar
Rack controller v2.1 or higher (FLSTDmFC0A) - 11
Current setpoint
*** bar
*** bar
*** bar

The plug-in is ready to be started and control the cooling cycle of the showcases based on the default parameters already set.

7. Starting Floating Suction Pressure Control

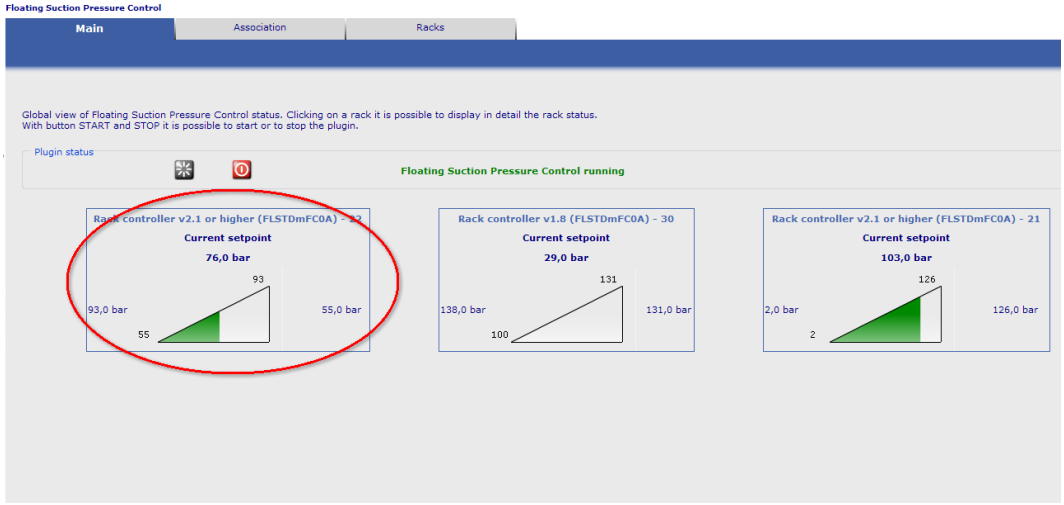
From the main page of the plug-in, click : Floating Suction Pressure Control is started and the first calculation is made of the duty cycle of each showcase.



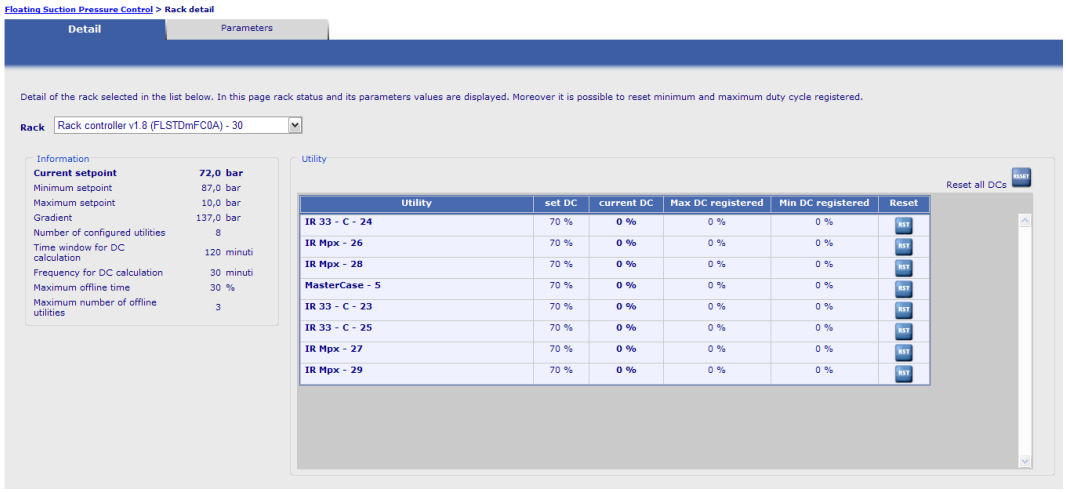
1	**Current set point**	Current value of the Set Point variable on the compressor rack
2	**Minimum set point**	Minimum value available for the Set Point variable on the compressor rack
3	**Maximum set point**	Maximum value available for the Set Point variable on the compressor rack

8. Checking the status of the systems

After having started the control, the trend of the set point on each compressor rack can be checked by reading the graph on the main page.
If all the showcases associated with the compressor rack have a duty cycle lower than the maximum set point defined for the showcase, Floating Suction Pressure Control will increase the value of the set point on the compressor rack.
If, on the other hand,, at least one showcase has a duty cycle above the maximum duty cycle set, Floating Suction Pressure Control will decrease the value of the set point on the compressor rack.
To see which showcase is making the request, double click the compressor rack to see the details.



Compare the page with the list of parameters used by Floating Suction Pressure Control and the duty cycle values for each showcase:


Floating Suction Pressure Control > Rack detail
Detail
Parameters
Detail of the rack selected in the list below. In this page rack status and its parameters values are displayed. Moreover it is possible to reset minimum and maximum duty cycle registered.
Rack
Rack controller v1.8 (FLSTDmFC0A) - 30
Information
Current setpoint 72,0 bar
Minimum setpoint 87,0 bar
Maximum setpoint 10,0 bar
Gradient 137,0 bar
Number of configured utilities 8
Time window for DC calculation 120 minuti
Frequency for DC calculation 30 minuti
Maximum offline time 30 %
Maximum number of offline utilities 3
Utility
Reset all DCs
Utility | set DC | current DC | Max DC registered | Min DC registered | Reset
IR 33 - C - 24 | 70 % | 0 % | 0 % | 0 %
IR Mpx - 26 | 70 % | 0 % | 0 % | 0 %
IR Mpx - 28 | 70 % | 0 % | 0 % | 0 %
MasterCase - 5 | 70 % | 0 % | 0 % | 0 %
IR 33 - C - 23 | 70 % | 0 % | 0 % | 0 %
IR 33 - C - 25 | 70 % | 0 % | 0 % | 0 %
IR Mpx - 27 | 70 % | 0 % | 0 % | 0 %
IR Mpx - 29 | 70 % | 0 % | 0 % | 0 %

NOTE: for the description of the compressor rack parameters, see *List of compressor rack parameters*.

Variable	Description
Set DC	Maximum value of the duty cycle set on the **Parameters** page
Current DC	Last calculated duty cycle value
Min DC recorded	Minimum duty cycle value recorded
Max DC recorded	Maximum duty cycle value recorded
RST	Resets the minimum and maximum values saved
RESET	Resets the minimum and maximum values saved for all the showcases associated with the rack

For example if the **current DC** exceeds the set DC, it means that the showcase is struggling to reach the operating temperature, and must be checked.
Press **RST** to set the minimum and maximum duty cycle values of a showcase to zero, for example the maximum duty cycle set has been changed (see *When to modify the maximum duty cycle of a showcase*).

Press **RESET** to set the minimum and maximum duty cycle values of all the showcases to zero, for example the compressor rack parameters have been modified (see *When to modify the rack parameters*).

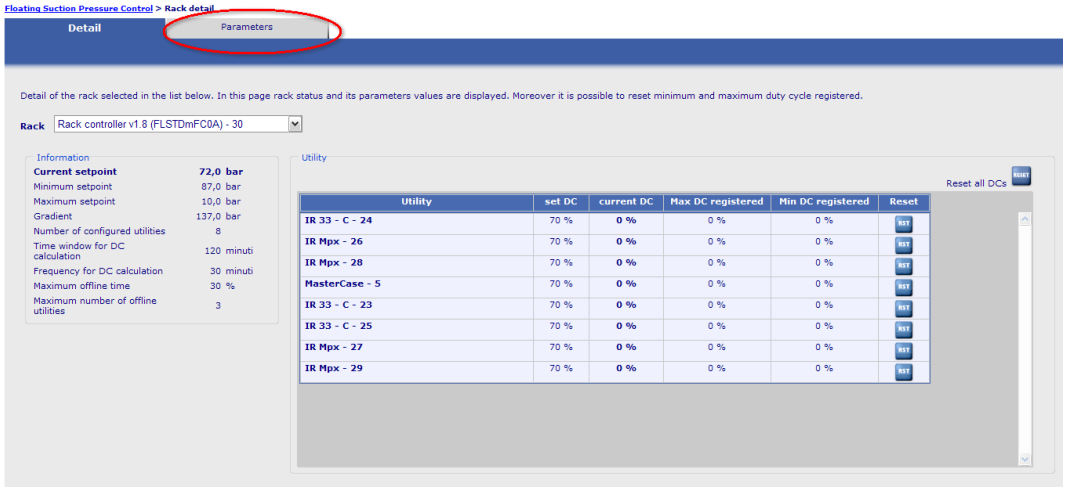
9. Customising the compressor rack and showcase parameters

Floating Suction Pressure Control is supplied with standard parameters that manage the operation of the control.
Nonetheless, some of the compressor rack parameters or the maximum duty cycle of a showcase can be changed, for example to adjust the algorithm to the specific installation.
The custom parameters are always saved in the database, even after disabling the compressor rack (see *Configuring Floating Suction Pressure Control*).

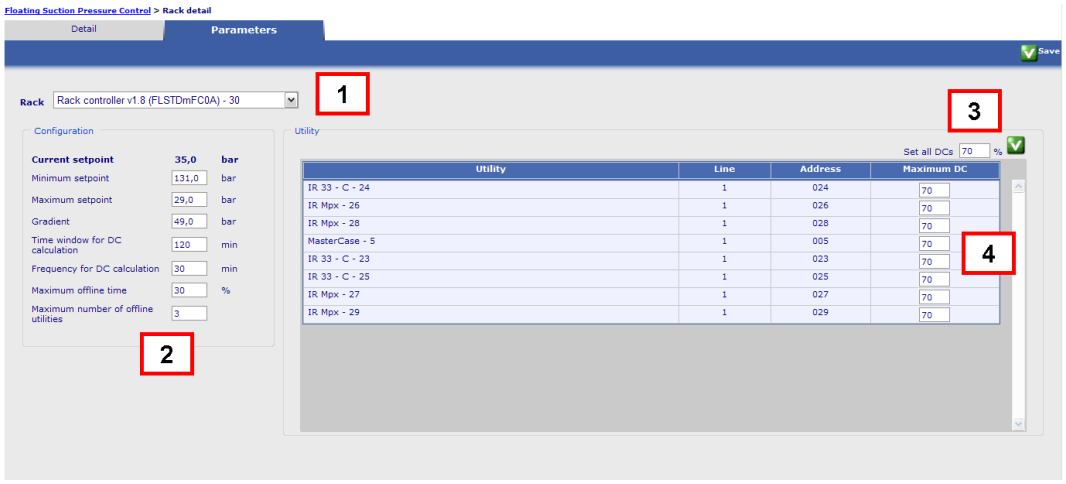
NOTE: after having modified the compressor rack or showcase parameters, always re-start the control.

When to modify the rack parameters	For example, if the installation has a lot of showcases, to increase the maximum number of showcases for a failed connection. Alternatively, if the installation has network problems, the maximum offline time may need to be increased.
When to modify the maximum duty cycle of a showcase	If when checking the **Detail** page all the values saved for the duty cycle are above to the maximum duty cycle set, check the operation of the showcase and if necessary increase the maximum duty cycle set.

To modify the parameters, on the compressor rack **Detail** page, click **Parameters**:


Floating Suction Pressure Control > Rack detail
Detail
Parameters
Detail of the rack selected in the list below. In this page rack status and its parameters values are displayed. Moreover it is possible to reset minimum and maximum duty cycle registered.
Rack
Rack controller v1.8 (FLSTDmFC0A) - 30
Information
Current setpoint 72,0 bar
Minimum setpoint 87,0 bar
Maximum setpoint 10,0 bar
Gradient 137,0 bar
Number of configured utilities 8
Time window for DC calculation 120 minuti
Frequency for DC calculation 30 minuti
Maximum offline time 30 %
Maximum number of offline utilities 3
Utility
Reset all DCs
Utility | set DC | current DC | Max DC registered | Min DC registered | Reset
IR 33 - C - 24 | 70 % | 0 % | 0 % | 0 %
IR Mpx - 26 | 70 % | 0 % | 0 % | 0 %
IR Mpx - 28 | 70 % | 0 % | 0 % | 0 %
MasterCase - 5 | 70 % | 0 % | 0 % | 0 %
IR 33 - C - 23 | 70 % | 0 % | 0 % | 0 %
IR 33 - C - 25 | 70 % | 0 % | 0 % | 0 %
IR Mpx - 27 | 70 % | 0 % | 0 % | 0 %
IR Mpx - 29 | 70 % | 0 % | 0 % | 0 %

The **Parameters** page will show the parameters of the compressor rack and the maximum duty cycle that can be set:


Floating Suction Pressure Control > Rack detail
Detail
Parameters
Save
Rack
Rack controller v1.8 (FLSTDmFC0A) - 30
1
3
Configuration
Current setpoint 35,0 bar
Minimum setpoint 131,0 bar
Maximum setpoint 29,0 bar
Gradient 49,0 bar
Time window for DC calculation 120 min
Frequency for DC calculation 30 min
Maximum offline time 30 %
Maximum number of offline utilities 3
2
Utility
Set all DCs 70 %
Utility | Line | Address | Maximum DC
IR 33 - C - 24 | 1 | 024 | 70
IR Mpx - 26 | 1 | 026 | 70
IR Mpx - 28 | 1 | 028 | 70
MasterCase - 5 | 1 | 005 | 70
IR 33 - C - 23 | 1 | 023 | 70
IR 33 - C - 25 | 1 | 025 | 70
IR Mpx - 27 | 1 | 027 | 70
IR Mpx - 29 | 1 | 029 | 70
4

1	Select the compressor rack whose parameters are being set.
2	Compressor rack parameters used by the control.
3	Maximum duty cycle to be set on all the showcases for the compressor rack and button to save the data.
4	Maximum duty cycle to be set on the individual showcase for the compressor rack in question.

Modify the parameters and click to save the changes.
Stop and restart the control to make the changes effective.

10. List of compressor rack parameters

Parameter	Description	Default
Current set point	Current value of the Set Point variable on the rack	-
Minimum set point	Minimum value available for the Set Point variable.	-
Maximum set point	Maximum value available for the Set Point variable.	-
Gradient	Establishes how much the set point will be increased and decreased by following the calculation of the duty cycle on the showcases	-
Time window for the DC calculation	Indicates how long the data corresponding to the solenoid on each individual showcase is saved in the memory. The duty cycle will be calculated based on these data; once the window is full each new value will overwrite the oldest value. The value may vary from 10 to 180 minutes.	120 minutes
DC calculation frequency	Indicates how often the duty cycle must be calculated for the showcases associated with the rack, and consequently the set point changed if necessary. The value may vary from 10 to 180 minutes.	30 minutes
Maximum failed connection time	Maximum percentage of failed acquisitions for each showcase associated with the rack. If this is exceeded, the showcase is considered offline.	30%
Maximum number of showcases not connected	If when the duty cycle is calculated the showcases that are offline exceed this number, the set point is not changed on the rack.	3

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